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Subject: Technical Assistance Visit to the Dragoon and Santa Catalina Mountains

To: Forest Supervisor, Coronado National Forest

On January 28, 2004, Bobbe Fitzgibbon, entomologist with Forest Health Protection, met with Coronado NF staff and members of the public at Cochise Stronghold to observe tree mortality occurring in Arizona cypress, *Cupressus arizonica*, and juniper, *Juniperus* spp. Forest Service personnel included Randall Smith and Bob Lefevre from the Coronado SO; District Ranger Doug Hardy; and District staff Jeanetta Holt, Ruben Amesquito, and Gary Helbing. Following this visit, Bobbe accompanied Randall and Bob to the Santa Catalina Mountains, where cypress mortality was observed in Bear Canyon.

On the approach to the Stronghold, along Stronghold Canyon, recent extensive cypress mortality was evident. Examination revealed that the tree mortality was due to Cypress bark beetles, *Phloeosinus* spp. These are native insects. At endemic levels, they attack unhealthy trees. During periods of drought, however, they can reach outbreak population levels by attacking drought-stressed trees. The increased beetle population has been gradual and consistent with the persistent drought conditions in the Dragoons.

Residents began to notice cypress mortality about 7 years ago, and the mountain range has been dryer than normal for about 10 years. Infested trees ranged from large diameter trees down to trees that were less than two inches in diameter at the base. Since the infestation has reached epidemic proportions, there is little that can be done in the general forest. Juniper mortality was also observed. Borer activity in the trees was so extensive that it was not possible to determine if the mortality was attributed to *Phloeosinus* spp. or to drought followed by infestation by the borers.

Figure 1. ***Phloeosinus cristatus*** ***Phloeosinus* spp. galleries**

Private landowners were shown the beetle galleries and larval forms in the bark. They were informed that when live adults or larvae are present in the cambial layer or in the bark, the tree is currently infested. Trees with multiple exit holes in the outer layer of bark and with no larval forms visible when patches of damaged bark are shaved away are considered vacated or no longer infested. The landowners were advised that currently infested trees in the vicinity of high value green trees of the same species on their property should be cut and removed from the area, cut and burned, or cut and debarked.

A method of covering bucked trees with clear plastic was discussed. This method is viable as long as the covering is tightly sealed to the ground so temperatures can reach a lethal level and kill the bark beetles. This method fails when wind or animal activity is able to lift the covering or put holes in the plastic. Vacated trees may remain as long as they are not a hazard or present a fire danger to the dwelling.

Some of the natural enemies of the bark beetles have a longer developmental time than their host so that removing vacated trees can hinder the population increase of the natural enemies. Slow, deep watering of high value trees during periods of dry weather is a good practice for preventing drought stress. Homeowners have been working with Ruben to consolidate dead material from their yards to be burned in the pasture by the Stronghold. Cut materials should be gathered promptly after cutting and burned as soon as possible. Since the beetles will begin to fly within the next few months, currently infested yard trees should be removed soon to protect residual trees.

After spending a couple of hours on the Douglas RD, Bobbe, Randall, and Bob proceeded to the Santa Catalina Mountains to look at the cypress mortality on that District. Tree mortality was observed by District personnel prior to the Aspen Fire. In this area, multiple large trees were found to be either already dead or exhibiting top-kill. Examination of the bark on the bole of the trees showed very few galleries of *Phloeosinus* spp.; however, examination of the limbs of the trees showed multiple galleries that were consistent with *Phloeosinus* spp. A species of cypress bark beetle, *Phloeosinus furnissi*, previously collected in Bear Canyon attacks mainly the large limbs of the trees. It is possible that this species is responsible for the tree mortality; however, since no adult insects were collected, this was not confirmed.

Since the tree mortality is so widespread, it is unlikely that any control measures such as cutting and removing the infested trees would be recommended. There is some indication that a fungus, *Coryneum cardinale*, is introduced by the beetles to aid them in killing the tree. Removing the tops of trees where the infestation is confined to the upper bole is unlikely to be effective in saving drought-stressed trees, especially if a disease organism has already been introduced.

For further information on *Phloeosinus* spp., see the Yavapai County Extension website http://cals.arizona.edu/pubs/insects/az1316.pdf.

If you require further information or have any questions about this report, please contact Bobbe Fitzgibbon at bfitzgibbon@fs.fed.us or by phone at 928-556-2072.

/s/ John Anhold
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